



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

*H. H. Hicks  
01-14-03*

Inventors: Richard H. Hicks and Ben C. Song Art Unit: 1714  
Serial Number: 10/029,438 Examiner: Medley, Margaret B.  
Filing Date: 12/24/2001

**DECLARATION OF INVENTOR**

I, Richard H. Hicks, declare:

1. I am one of the inventors named in the above patent application.
2. I have formal European qualifications in Mechanical and Aeronautical Engineering (for which there is no direct US equivalent). I am also a member of the Society of Automotive Engineers and American MENSA.
3. I have extensive experience, both technical and commercial, in my chosen field of fluid dynamics. My "green card" (allowing me to work here in the USA) was issued under the category of "persons of outstanding natural ability in the arts or sciences."
4. I have been working professionally with liquid hydrocarbon emulsion fuels as well as both macro and micro emulsion fuel additives for over 20 years. I am president of my own research and manufacturing company (H2OIL Corporation) which for the last 12 years has specialized in the field of emulsion fuels and emulsion fuel additives.

3

PRIOR ART

5. As indicated in the background of the invention portion of the application, the inventors are familiar with the teachings of U.S. Patent # 4,396,400 (Granette, et.al.) which is the closest prior art patent that we could find.

6. Granette's inventors are French and their reference to "gas oil" is to what Americans refer to as automotive diesel fuel. This distinction is made in the fifth and sixth paragraphs of the Granette description. One concludes therefore that Granette's mixtures do not work with gasoline. The additive of our invention works with both diesel fuel and with gasoline.

7. The examiner is quite correct in stating that if the water comprises 10 to 65% by weight of our additive (and if the co-surfactant is absent) then presumably the surfactant(s) must therefore comprise the balance of 90 to 35% by weight of the additive. However, we also stipulate the required ratio between the weights of the surfactant(s) and the water (something that Granette failed to realize was of any significance once the added water content approaches that of the dissolved water content).

8. Granette discloses an added water content range from 100 ppm to 5,000 ppm. However, Granette actually teaches away from the 100 ppm water content (column 6, line 10) by stating that 1,000 ppm of water gives the optimum overall improvement. We suspect that this is because the performance of his emulsion fuel with 100 ppm added water was probably erratic due to instability problems caused by dissolved water already present in the fuel.

9. Granette gives only two examples using 100 ppm water (#2 and #17). In our opinion, both of these examples have an insufficient surfactant to water ratio of only 1:4 (instead of 2:1) and therefore probably unstable over time (and hence not commercially practical). We believe that Granette failed to appreciate the significance of the 75 ppm background dissolved water level (as well as how to fix the problem) and hence failed to

investigate the huge potential of ultra low water content emulsion fuels (i.e. those with less than 100 ppm water).

10. Compare Granette examples #2 and #3 with regard to the critical surfactant to water ratio. In column 3, paragraph 7, Granette admits that this ratio is important when he states "the quantity of the surfactant utilized is proportional to the quantity of water to be solubilized." Granette examples #2 and #3 result in the following surfactant to water ratios when the 75 ppm background level of dissolved water is not included :-

	<u>Example #2</u>	<u>Example #3</u>
Water (ppm)	100	1,000
Co-surfactant (ppm)	25	500
Surfactant (ppm)	25	500
Surfactant to Water Ratio	1:4	1:2

Now compare the surfactant to water ratios for the same two examples (#2 and #3) when the 75 ppm background level of dissolved water is included :-

	<u>Example #2</u>	<u>Example #3</u>
Water (ppm)	175 (100+75)	1,075 (1,000+75)
Co-surfactant (ppm)	25	500
Surfactant (ppm)	25	500
Surfactant to Water Ratio	1:7	1:2.15

As can be clearly seen, the 75 ppm dissolved water has a negligible effect in example #3 (1,000 ppm water), where the surfactant to water ratio increases from 1:2 up to 1:2.15 (only a 7½% increase). However, this dissolved water has a disproportionate

effect in example #2 (100 ppm water) where it increases the surfactant to water ratio from 1:4 up to 1:7 (a 75% increase) causing almost certain fuel emulsion instability.

11. Although the added water content of the emulsion fuels of the Applicant and Granette actually approach each other (at about 100 ppm) each teach improvements with water content moving in opposite directions. Applicants teach that less water is better in the fuel emulsion, whilst Granette teaches that more water is better.

12. We conclude therefore, that Granette does not teach our invention nor render our mixtures obvious.

#### DECLARATION OF INVENTOR – UNOBFVIOUSNESS

1. The unusual, surprising and unexpected result when using ultra low water content fuel emulsions (95 ppm or less water) is the significant improvement in vehicle fuel economy which can happen (typically 8%), thereby allowing the invention to be employed in a cost effective manner not previously realized.

2. The present invention also solves an unrecognized problem associated with ultra low water content fuel emulsions. Without extra surfactants, any ultra low water content fuel emulsion (typically 40 ppm added water) would slowly be overwhelmed by the background level of dissolved water always present in all commercial fuels (typically 50-100 ppm). By employing an unusually high surfactant to water ratio (typically 2: 1) we achieve the long term fuel emulsion stability necessary for commercial success.

3. The additives in accordance with our invention are sold in several countries to individuals with various driving habits and as additives to both gasoline and diesel fuel. There are few complaints and none indicating the mixtures become unstable and cause mechanical problems. These ultra low water content emulsion fuels/additives have already achieved a significant level of commercial success. We are currently the #1 selling aftermarket fuel additive in Japan (sold by Kure under their own trade names

"Power Booster" and "Super Power Booster"). We have also achieved substantial sales in China, Thailand, Singapore and Malaysia. During the last three years, our overseas sales for additives using this technology have been well over \$3 million. Commercial success is always a good indicator for "unobviousness".

4. As further evidence, I offer the results from two more tests which clearly show fuel economy benefits can improve substantially as the added water content of the emulsion fuel falls below 100 ppm (unusual, surprising and unexpected result). In these examples, an additional 21 ppm water is over three times more effective at improving fuel economy than was 42 ppm additional water. Less water can be more effective.

#### Example #21

##### Test #21A

Concentrated micro-emulsion additive #16 was mixed with California #2 diesel fuel using a treat rate of 125 ppm (8,000:1), or about 21 ppm of additional water. This fuel was used in a series of tests on a 1983 Ford F-250 pick up truck (odometer 90,000 miles) equipped with a 6.9L indirect injection Navistar 8 cylinder engine and a 3 speed automatic transmission. Testing was done by UC Riverside College of Engineering, Center for Environmental Research and Technology (CE-CERT) using the FTP75 test protocol to measure fuel economy changes. Two baseline tests were conducted followed by a 3,000 mileage accumulation (with additive #16 at 8,000:1) and then two more fuel economy tests. The following results indicate fuel economy changes:-

Fuel Economy (21 ppm water)	4.3% improvement over baseline
-----------------------------	--------------------------------

##### Test #21B

CKET NO. 01-470-WSB

A further 3,000 miles were then accumulated on this vehicle, but this time using additive #16 at a higher treat rate of 250 ppm (4,000:1), or about 42 ppm additional water. This was then followed by two more FTP 75 tests to measure any fuel economy changes. The following results indicate fuel economy changes:-

Fuel Economy (42 ppm water)      1.3% improvement over baseline

I hereby declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001 and such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Date: December 24, 2002

By: Richard H. Hicks  
Richard H. Hicks